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| EXAMINER |
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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 10/719,693  
Filing Date: November 21, 2003  
Appellant(s): MCEL RATH ET AL.

**MAILED**

**APR 19 2007**

**GROUP 2800**

Kenneth D. Goodman  
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed December 21, 2006 appealing from the Office action mailed August 14, 2006.

**(1) Real Party in Interest**

A statement identifying by name the real party in interest is contained in the brief.

**(2) Related Appeals and Interferences**

The examiner is not aware of any related appeals, interferences, or judicial proceedings, which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**(3) Status of Claims**

The statement of the status of claims contained in the brief is correct.

**(4) Status of Amendments After Final**

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

**(5) Summary of Claimed Subject Matter**

The summary of claimed subject matter contained in the brief is correct.

**(6) Grounds of Rejection to be Reviewed on Appeal**

The appellant's statement of the grounds of rejection to be reviewed on appeal is substantially correct. The changes are as follows:

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Claims 1-2 and 5-6 are merely objected to and not unclear AND indefinite due to the use of the term "cross-sectional dimension". It should be noted that an objection was put forth, not a 35 U.S.C. 112 rejection. Accordingly, this issue is not appealable.

**(7) Claims Appendix**

The copy of the appealed claims contained in the Appendix to the brief is correct.

**(8) Evidence Relied Upon**

|              |         |        |
|--------------|---------|--------|
| 2002/0085968 | SMALLEY | 7-2002 |
|--------------|---------|--------|

|           |     |        |
|-----------|-----|--------|
| 6,250,984 | JIN | 6-2001 |
|-----------|-----|--------|

Definitions from The American Heritage Dictionary, Second College Edition, Houghton Mifflin Company, Boston 1982.

**(9) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1-10 rejected under 35 U.S.C. 103(a) as being unpatentable over Smalley et al. (US PUB 2002/0085968) in view of Jin et al. (US 6,250,984).

Regarding claim 1, Smalley discloses a carbon nanotube particulate on a surface wherein the carbon nanotube particulate comprises entangled small-diameter carbon nanotubes (page 7, paragraph 89) arranged in a three-dimensional network (Abstract) wherein the small-diameter nanotubes have an outer diameter in a range of about 0.5 nm and about 3 nm (page 7, paragraph 88), wherein the carbon nanotube particulate has a cross-sectional dimension in a range of about

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0.1 micron and about 100 microns (page 7, paragraph 88), but does not expressly disclose that carbon nanotube particulate is an electron emitter, as claimed by Applicant. Jin is cited to show a carbon nanotube is used as an electron emitter (FIG. 12, item 112) in a field emission display (column 3, lines 8-14). Jin also shows that carbon nanotubes are typically in the form of high-aspect ratio fibers resembling tangled spaghetti or needles and can single or multi-walled nanotubes (column 5, lines 51-59) and teaches that the nanotubes tend to have sharp, field-concentrating tips useful for electron field emission (column 5, lines 59-61).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Smalley's invention to include the carbon nanotube particulate as an electron emitter as suggested by Jin for using the carbon nanotube as an electron emitter.

Regarding claim 2, the combined reference of Smalley and Jin disclose the electron emitter of claim 1 wherein the particulate has a cross-section dimension in the range of about 0.1 micron and about 3 microns (Smalley; page 7, paragraph 88).

Regarding claim 3, the combined reference of Smalley and Jin disclose the electron emitter of claim 1 wherein the carbon nanotubes are selected from the group consisting of single-walled carbon nanotubes, double-walled carbon nanotubes, triple-walled carbon nanotubes, quadruple-walled carbon nanotubes and combinations thereof (Smalley; page 3, paragraph 58).

Regarding claim 4, the combined reference of Smalley and Jin disclose the electron emitter of claim 1 wherein the carbon nanotube particulate comprises ropes of carbon nanotubes (Smalley; page 7, paragraphs 88-89).

Regarding claim 5, the combined reference of Smalley and Jin disclose the electron emitter of claim 4 wherein the ropes have a cross-sectional dimension in a range of about 10 nm and about 50 nm (Smalley; page 7, paragraph 88).

Regarding claim 6, the combined reference of Smalley and Jin disclose the electron emitter of claim 4 wherein the ropes have a cross-sectional dimension less than 10 nm (Smalley; page 7, paragraph 88).

Regarding claim 7, the combined reference of Smalley and Jin disclose the electron emitter of claim 4 wherein the carbon nanotube particulates comprise small-diameter carbon nanotubes having more than about 10 small-diameter carbon nanotubes/ $\mu\text{m}^2$  surface area of the carbon nanotube particulates (Smalley; page 7, paragraph 89).

Regarding claim 8, Applicant is claiming the product of a carbon nanotube particulate including a method (i.e. a process) of making the carbon nanotube particulate activated by etching, consequently, claim 8 is considered a “product-by-process” claim. In spite of the fact that a product-by-process claim may recite only process limitations, it is the product and not the recited process that is covered by the claim. Further, patentability of a claim to a product does not rest merely on the difference in the method by which the product is made. Rather, is the product itself which must be new and not obvious. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process. *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). Accordingly, the structure implied by the process steps would be considered for assessing the patentability of product-by-process claims over the prior art (see MPEP 2113).

Regarding claim 9, the combined reference of Smalley and Jin disclose the electron emitter of claim 4 wherein the electron emitter is a component in a cathode (Smalley; FIG. 6, item 110) of a field emission device.

Regarding claim 10, the combined reference of Smalley and Jin disclose the electron emitter of claim 9 wherein the field emission device is selected from the group consisting of electron tubes, amplifiers, oscillators, mixers, microwave components, discharge initiators, laser tubes, spark gaps, controlled discharge tubes, directed energy devices, display tubes, flat-panel displays and combinations thereof (Jin; column 3, lines 11-14).

#### **(10) Response to Argument**

Applicant's arguments beginning at page 3, in regards to the rejection of claims 1-10 under 35 U.S.C. 103(a) as being unpatentable over Smalley et al. (US PUB 2002/0085968) in view of Jin et al. (US 6,250,984) have been considered, but are not persuasive. Applicant contends that Jin discloses a process for fabricating nanotube filed emitter structures. The Examiner points to Jin, which discloses that nanotubes protrude from a supporting base material to provide desired emission properties, which results in being used in a variety of devices (column 3, lines 8-14). Jin teaches that it is clearly known for a carbon nanotube to be used as an electron emitter. Furthermore, Jin teaches that carbon nanotubes are in the form of high-aspect ratio fibers resembling tangled spaghetti or needs and can be single or multi-walled nanotubes (column 5, lines 59-61). Applicant also contends that Smalley teaches a felt or a mat comprising a tangled collection of single-wall carbon nanotubes ropes stuck together. The Examiner points to Smalley, which discloses that a rope is made up of a number of single-wall carbon nanotubes

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with a diameter in the range of 1.38 to 1.4 nm (page 7, paragraph 88) and a cross-sectional dimension in a range of 0.1 to 1,000 microns (page 7, paragraph 88). Jin is merely in combination with Smalley to show that it known in the art to have a carbon nanotube used as an electron emitter. It should also be noted that the limitation of "an electron emitter" is recited in the preamble and it is very old and well-known that a carbon nanotube is used as an electron emitter in a variety of devices including field emission displays, flat panel displays, or microwave-amplifiers. For the above stated reasons, it is considered that the Applicant has failed to provide evidence in the record to support his contention that the device as combined by Smalley and Jin is patentably distinct from the device as covered by claims 1-10 of the instant application.

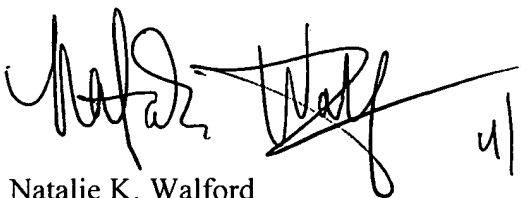
Furthermore, it should be noted that the objection set forth with regards to claims 1-2 and 5-6 is merely an objection. Accordingly, this issue is not appealable, but petitionable.

**(11) Related Proceeding(s) Appendix**

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,



4/12/07

Natalie K. Walford

Patent Examiner

Sikha Roy  
SIKHA ROY  
PRIMARY PATENT EXAMINER



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Conferees:

Ricky Mack

A handwritten signature in black ink, appearing to be 'RM' or similar initials, written over the printed name.

Supervisory Patent Examiner

Nimesh Patel

A handwritten signature in black ink, appearing to be 'NP' or similar initials, written over the printed name.

Supervisory Patent Examiner